THE FIRST BATTALION IN ACTION

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copy one

The First Battalion in Action

More than One Thousand Sightless Workers are now being employed in Industry. Here are some Examples from Representative Firms

THE possibility of employing blind workers in engineering is of growing importance to managements, and an article on the subject was published in the June-July issue of PRODUCTION AND ENGINEERING BULLETIN. In view of the great interest aroused, the present article has been written to give, in greater detail, particulars of the sort of jobs that blind people can undertake. There are well over one thousand blind workers now absorbed by engineering trades, doing work that releases almost a battalion of sighted workers for the Services.

The present article deals, in the main, with blind employees at three works, two of which are electric lamp and valve factories, while the third produces aircraft engines. All three works are similar in one respect; the blind workers are not segregated, but work side-by-side with the sighted employees.

In one works engaged on lamp making, about a dozen blind men are in the works and one blind girl in the laboratory. One of the men is now capable of undertaking quite a wide range of simple operations.

One job, for example, is bending strips of nickel and soft iron round formers to produce small rings and cylinders. The metal is soft and readily wrapped round a former by hand, the final shaping being done by a few deft taps from a light hammer. The quantities in which these parts are to be made do not warrant press operations.

Seal bending is another of this man's jobs. In some instances he uses small jigs for the work. After the three wires have been sealed in glass the outer ones must be accurately bent to shape.

The complete assembly (*see* page 549) is placed in the jig, and the outer wires are splayed slightly by hand; then a lever is operated to cause a punch to engage with the outer wires and give them a double right-angled set. For a different type of lamp, each of two wires must have several specific bends. This is done by the use of suitable pairs of pliers with noses of various widths, the wires being gripped in the pliers and bent round the sides of their jaws, which thus act as formers.

Another little job, that is slightly more awkward than it appears, is also done by this man. A small glass bead with two wires attached must be inserted in a glass tube, and the wires then splayed out again. The wires are brought together, inserted into the tube and threaded through the constricted end of it.

When the wires are again splayed they must not be crossed, but unless the greatest of care is taken this will happen, since they seem to have a natural tendency to cross when they are closed together.

Small fixtures or small hand presses are used to bend various types of clips, etc., from wire and metal ribbon.

Packing small lamps and other products is a job that is successfully done by blind men. Some of the lamps are wrapped in corrugated cardboard which has been cut into strips by the packer; he places these lamps in knock-down boxes which he has received in the flat state and opened out. Inserting tubes, lamps and other articles in holes in cardboard trays, wrapping lamps in cardboard and paper coverings, and other packing operations are regularly done by two blind men at this factory.

Swaging dies, used for reducing small ingots of valuable metals to a smaller diameter, are now being lapped by another blind man. Each die is in halves, that are held together on the table of a sensitive drilling machine. The abrasive-charged copper lap is held in the chuck of the machine and reciprocated in the die while rotating.

The operation of lamp-cap filling is also done by a blind person. This entails the extrusion of cement into a cap so that it forms a layer round the inside wall of the cap. The cement serves to secure the glass bulb to the cap.

This operation is done on a machine which has two small hoppers for cement and one for caps. Each cement hopper has an extrusion nozzle at its lower end with a fixture which holds a cap up to the outlet.

The cap hopper terminates in a receptacle from which the blind operator removes the caps two at a time. The caps are slipped into the fixtures, a compressed air valve is operated to charge the caps, and the two filled caps are then removed and placed in a tray.

In the same works two other blind men are doing some of the operations on resistance making. The resistance element, comprising a fine wire wound on a core of asbestos cord, is cut into lengths by one man. The second man binds the two ends with a stouter copper wire and ensures an electrical contact between the copper leads and the resistance wire. Girls then wind these resistances on to ceramic formers, and varnish them, the assemblies then returning to the two blind operators to be wound with insulating tape. (*See* page 549.)

Snap, Ring and Plug Gauging

The blind laboratory girl was at first employed on lapping diamond dies for wire drawing, and was capable of working on dies down to 0.003″ diameter. After a time she found the work rather monotonous, so she is now engaged on inspection work in the laboratory, where she uses snap, ring and plug gauges for checking numerous small parts.

Inspection work, where gauges can be used and reliance is placed on the sense of feel, has proved to be suitable work for the blind, and it has involved the use of fixed gauges such as " go " and " no go " snap or plug gauges. One American management however have modified their ordinary type of comparator, which has limit index pointers and a needle moving over a scale, to adapt it for use by a blind inspector.

The transparent covering of the scale has been removed and the limit indexes and the indicating needle have been bent outwards. The inspector can then readily feel whether or not a component under test has moved the needle outside the limit indexes. In this connection it might be mentioned that the blind commonly feel the hands and face of a watch to tell the time.

A British firm has also given thought to the matter of the use of comparators by the blind. This firm makes visible indicator comparators in which coloured lights indicate whether a component is over or under size or within the prescribed limits. A development of this instrument has been introduced in which the lights are replaced by bells so that the inspector is given an audible signal to indicate the size of the part under test. (*See* page 549.)

The position of the comparator feeler, as determined by the size of a component, controls the closure of electric contacts. This causes a high-note bell to ring if a component is too large, and a low-pitch note to be sounded by another bell if the component is under size. If a component is of a size that lies within the necessary limits, both bells ring simultaneously, to give a third readily distinguishable note.

One operator who has used this apparatus was originally trained as a mat maker and later became a press operator. At the time of his introduction to the audible signal comparator he was employed as a core maker in a foundry but he found no difficulty in attaining a good speed at inspection work.

A somewhat similar idea originated from the suggestion of a blind woman in America, to enable blind workers to weigh fuse powder and other substances. In this device a scale controls an electric circuit. If the article or material being weighed is too light or too heavy a Morse code A (dot-dash) or N (dash-dot) respectively is sounded. When the weight is correct a steady signal note is emitted.

Reverting to inspection work, the second British firm under consideration employs a man who uses fixed gauges, including thread gauges, for the inspection of aircraft engine parts. This inspector was the managing director of an import and export business before losing his sight and, according to the works superintendent, he has attained a high degree of efficiency.

Bench and Machine Operations

This firm employs another blind man on bench work and three others on machines. Two of the machinists are working on capstan lathes tapping and screwing various components, each of which must be chucked separately. The lathes are well guarded so far as belts and gearing are concerned, and one of them has an additional safety measure.

This additional precaution consists of a foot-operated brake which the operator can apply to stop the spindle positively after the power has been shut off. This prevents the operator from touching work before the spindle has stopped rotating. This brake cost only about £2 to make and fit, so the management considers that there is little justification for the opinion that to employ blind workers will entail heavy expenditure on additional safety measures.

When using self-opening dies for threading, the operator hears the opening of the dies and knows by this that the job is finished.

Polishing valves and other components is the work of the other blind operator who is engaged on a machine. He uses a polishing machine of the type in which the work is held in a chuck carried directly by a horizontal motor spindle, polishing being done with strips of abrasive cloth of different grades.

The work is held in an ordinary three-jaw chuck which has been shielded to prevent the operator from encountering the rapidly moving jaws. The entire chuck is enclosed in a cup-shaped shield which revolves with the work, and has in its flat side a hole just big enough to

AUDIBLE SIGNAL COMPARATOR for blind inspectors.
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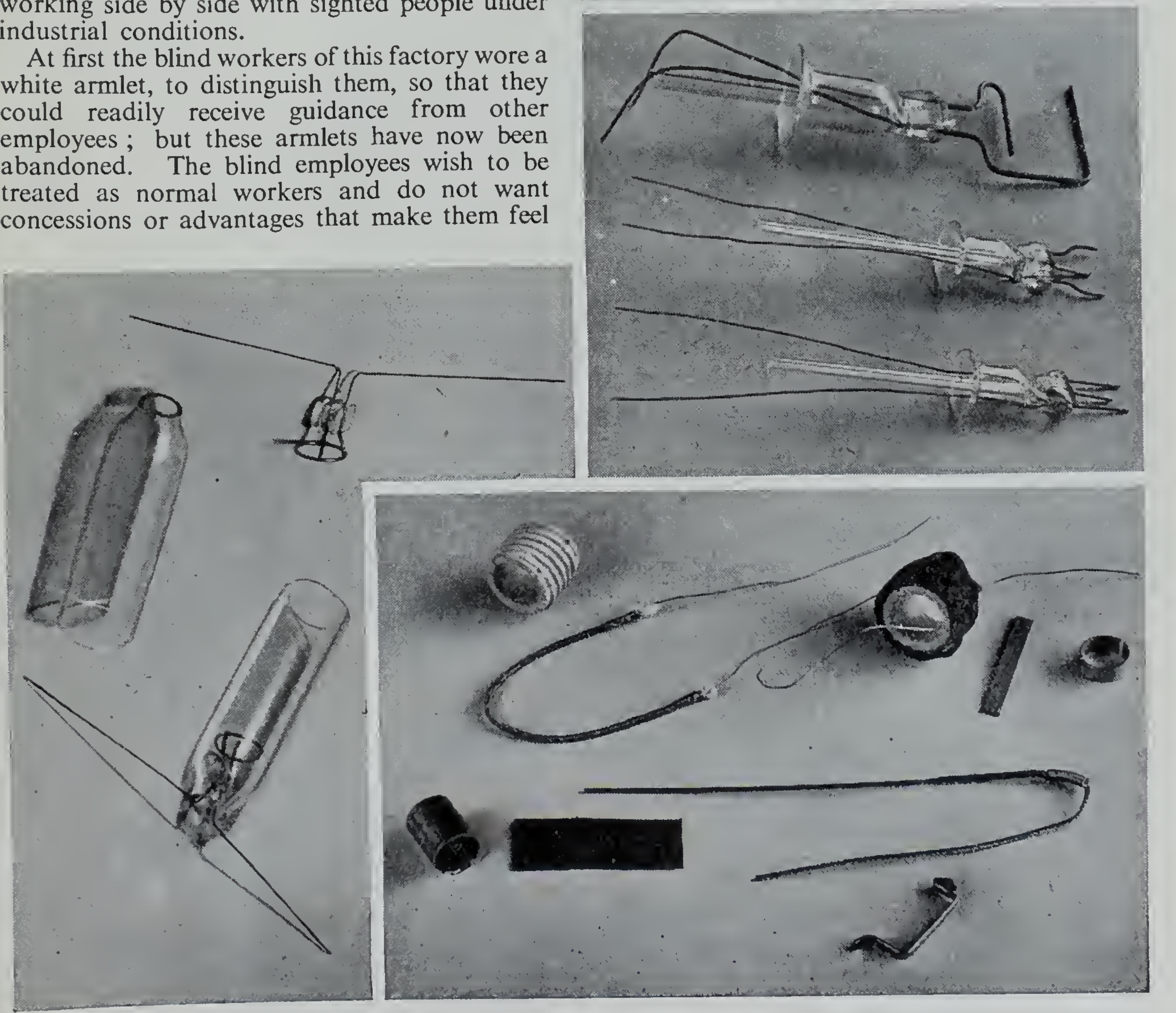
enable a component to be inserted in the jaws which are behind it. The cylindrical side of the cup is pierced with holes for the insertion of the chuck key.

The capstan lathes and polishing machine would normally be operated by girls or youths. The superintendent's view is that the output of blind operators is higher than that obtained in the normal way because of the greater powers of concentration shown by the blind workers, on jobs that soon prove monotonous for other operatives.

Another point making for high output is the keenness of the blind employee, who is anxious to prove his worth when he has the chance of working side by side with sighted people under industrial conditions.

At first the blind workers of this factory wore a white armlet, to distinguish them, so that they could readily receive guidance from other employees ; but these armlets have now been abandoned. The blind employees wish to be treated as normal workers and do not want concessions or advantages that make them feel

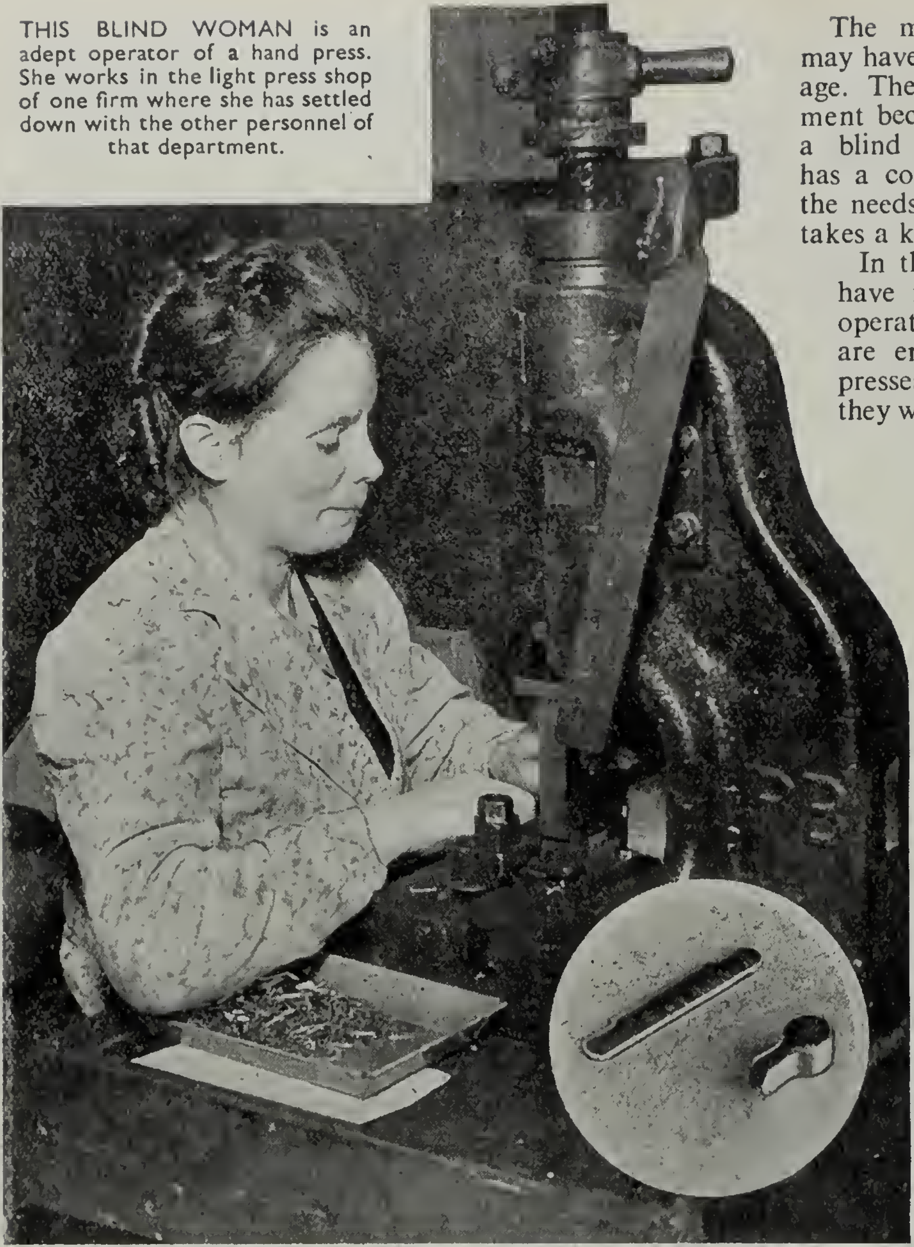


A VARIETY OF JOBS done at one works by blind employees is shown in the three lower illustrations and described in the accompanying text.

that they are not ordinary members of the works personnel.

Only one concession is made. The blind employees cease work at mid-day and evening a matter of five minutes before everyone else. This enables them to get to the canteen and bus before the rush starts.

This works has a canteen for women, but the men's canteen is at another branch nearby. It was decided to give the blind men a table in the women's canteen, but they soon asked to be allowed to use the men's canteen because they wanted to be regarded as ordinary employees.



THIS BLIND WOMAN is an adept operator of a hand press. She works in the light press shop of one firm where she has settled down with the other personnel of that department.

OPERATING A HAND PRESS to form the small clips, seen in the close-up, from straight blanks.

The men in the machine shop may have had one incidental advantage. They were put into that department because the foreman there has a blind mother, and he naturally has a considerable understanding of the needs of the new employees and takes a keen interest in them.

In the third works to which we have referred several blind press operators, including one woman, are employed on fly and foot presses. The presses on which they work are provided with safety devices of the same form as those on the machines used by sighted operators. In the case of fly presses a hand lever must be operated to move a stop away from the ram before the ram can be lowered by the fly. This necessitates the use of both hands for operation of the machine.

On the foot-presses two hand levers must be moved simultaneously to free the ram from stops. This is clearly shown in the accompanying illustration (*see* page 552) where a blind operator is piercing holes in the bottoms of shallow cups which are fed by hand, one at a time, into a nest in the die.

The work that is shown being done by the blind woman calls for a certain amount of accuracy in feeding the blanks to the tool. The blanks are short strips that are to be bent and formed into small clips. The press tool employed is one of the sort frequently used for such work comprising a two-part die into which the blank is carried by the punch, the two parts of the die then being cammed inwards to squeeze the blank on to the formed punch.

In this instance the blanks are fed by hand, three at a time, into the press tool, and each must be placed carefully into its nest in the upper face of the die. Each nest is formed by a shallow groove in the die face.

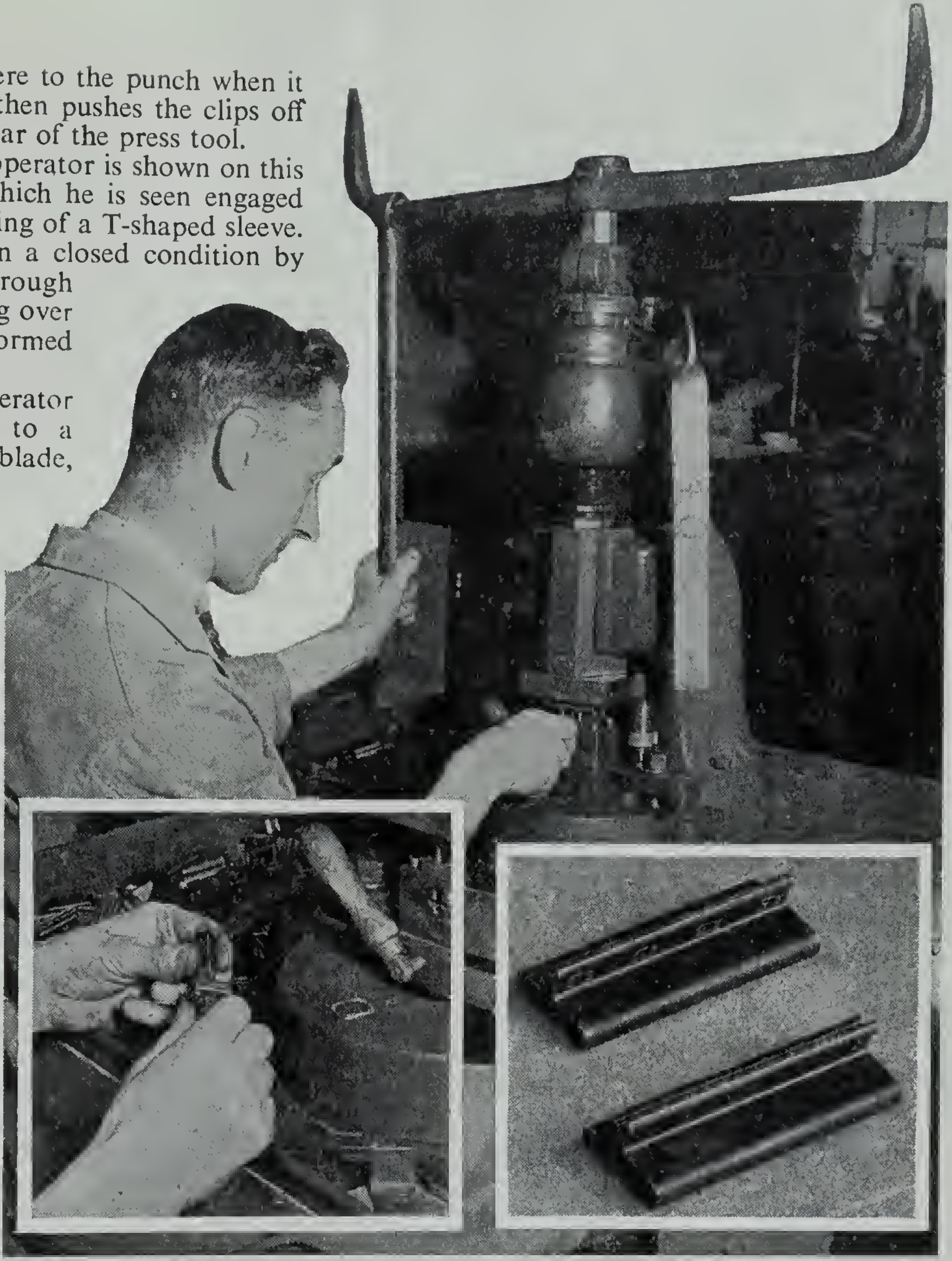
Thus three clips are formed at each stroke of the press and they adhere to the punch when it is lifted ; the operator then pushes the clips off the punch and to the rear of the press tool.

Another blind press operator is shown on this page. The work on which he is seen engaged is the closing and securing of a T-shaped sleeve. The sleeve is secured in a closed condition by shearing four slots through its leg and then bending over the tongues that were formed by the shearing.

To do this the operator threads the sleeve on to a mandrel comprising a blade, and a wire which enters the bead or bulge in the leg of the T. The sleeve is pushed on until it is in contact with a stop and it is then inserted in the press tool.

Operation of the press shears the tongues out of the component, and then the tongues are clinched over to secure the work by swinging the small handle seen at the front of the press tool.

In this works the blind people work alongside the sighted press operators. No special facilities are provided for them with the exception that they leave off a quarter of an hour earlier than the others so that they avoid the rush.



THE SLEEVES seen in the right hand close-up are being closed and secured in two operations by this blind press worker.

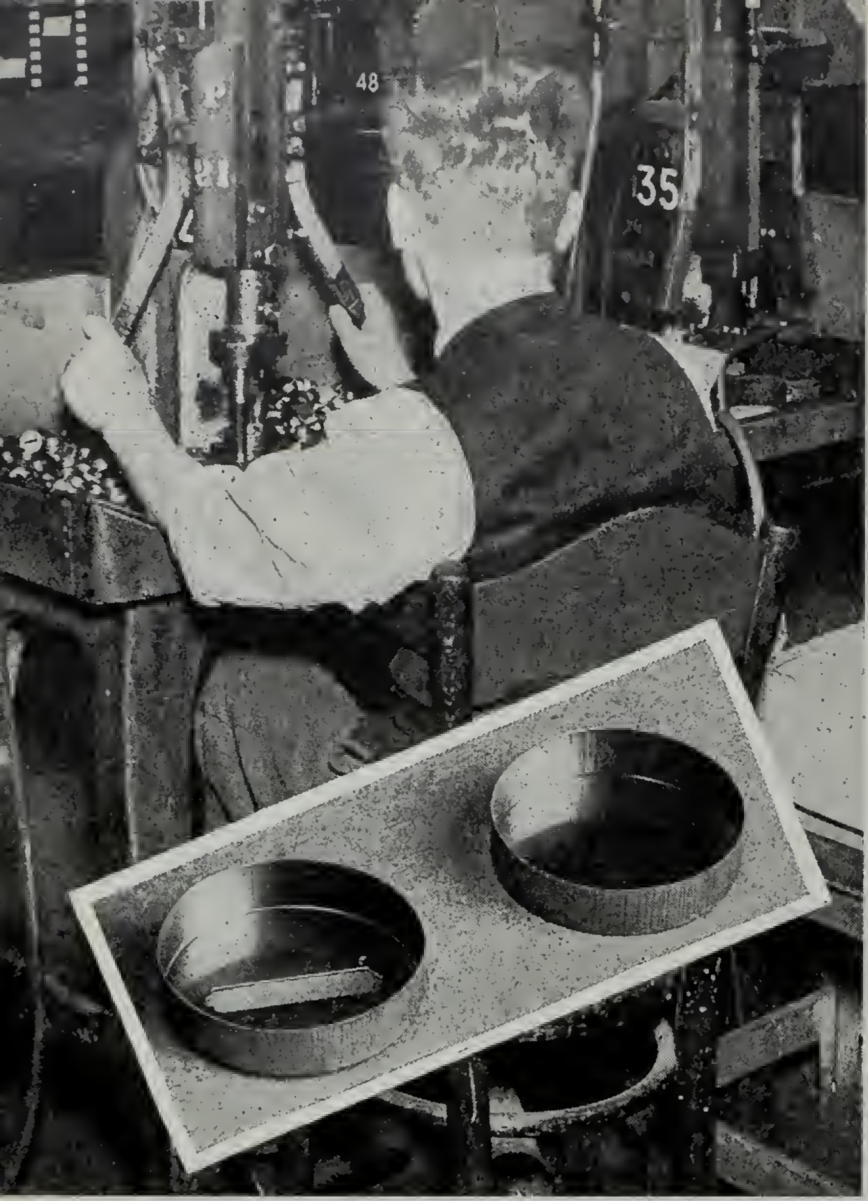
In watching blind workers engaged on engineering jobs, one is impressed by their concentration on the job. Further they are very deft in their movements and extremely methodical.

In picking up components, removing them from chucks, and in similar motions, their hands go straight to the spot without any fumbling. They seem to waste no movement. All these factors must contribute to their efficiency on work for which they are suited.

The three firms mentioned above, all of one Region, are but a few of the many who are employing blind workers. Many additional firms could employ them, to the mutual benefit of employer and employee. Your local Employment Exchange will be glad to furnish particulars of blind men and women available for employment in your neighbourhood.

In conclusion it should be mentioned that many blind people possess a considerable degree of manual skill, and enlightened management ensures that this skill or ability is put to proper use. Because a man is blind there is no reason why he should not be employed on work of the highest grade he can undertake.

Of course not all blind persons are capable



A FOOT OPERATED PRESS is seen in use here. This blind operator is punching slots in the bottoms of small cups. (See inset.) Each cup is fed in separately by hand and so this press, in common with all presses in this department, requires both hands of the operator to manipulate it. Danger of the descent of the ram while the operator's fingers are in the press tool is thus obviated. In this instance both hands are used to operate levers which actuate two stops for the ram, and pressure on the foot lever will not move the ram until both stops are removed by hand in the manner shown.

of doing a relatively high grade of work ; but this applies equally to fully sighted persons, and it is not usual to grade down sighted persons to the level of the less efficient, as sometimes seems to have been the attitude towards the blind. The blind worker himself wants to do the best work of which he is capable, and to be treated in the same way as other employees of a firm.

As mentioned in the opening of this article, the sightless workers employed at present are numerous enough to free able-bodied employees to form a battalion in the Services. The first battalion of blind engineering employees is already hard at work ; a second and third battalion could be put to useful work if sufficient consideration could be given to discovering what jobs they can do in the factory.

Where blind operatives are employed, resourceful managements speak well of them. Instead of looking at the apparent difficulties of employing the sightless they have discovered that there are definite advantages to be gained.

LAY-OUT FOR RAPID GAUGING

(*Continued from page* 546)

is done by a " go " and " no go " plate gauge *G*, which is provided with small nibs or projections that are able to enter the groove *D*. A simple type of plate gauge is used to check the length *H*.

Length *J* is checked by placing the component, small end downmost, in the gap of gauge *J*. The small nibs at the top of the gap are at different heights. By presenting the underside of the head first to one nib and then to the other, a check is made to see that length *J* is within its prescribed limits.

Finally a check is made on the concentricity of the bore E^1 with the outside diameter *A*. The arrangement seen at *K* is used for this. The component is pushed on to the spigot and rotated while the feeler of the dial gauge contacts its outside. An eccentricity is then indicate by the dial gauge.

This idea can be adapted for the gauging numerous small parts when each has sever dimensions that must be checked. Incidental a similar arrangement of gauges would b advantageous where inspection is done b one-armed workers, whether or not they a equipped with efficient artificial limbs ; o with the exception of the ordinary dial gaug shown, by a blind person.

It is hoped to publish in a future issue of " Production and Engineeri Bulletin " an article on frame gauges for quantity inspection.

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